CONVENTION

AUSTRALIA

Patents Act 1990

REQUEST FOR A STANDARD PATENT

AND NOTICE OF ENTITLEMENT

The Applicant identified below requests the grant of a patent to the nominated person identified below for an invention described in the accompanying standard complete patent specification.

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[54]Invention Title:

ADHESIVE POLYESTER FILM

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[31,33,32]

Details of basic application(s):-

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Applicant states the following:

1. The nominated person is the assignee of the actual inventor(s).

2. The nominated person is
   - the applicant
   - ~~the assignee of the applicant~~
   - ~~authorised to make this application by the applicant~~

   of the basic application.

3. The basic application(~~s~~) was/~~were~~ the first made in a convention country in respect of the invention.

The nominated person is not an opponent or eligible person described in Section 33-36 of the Act.

4 January 1996

Teijin Limited
By PHILLIPS ORMONDE & FITZPATRICK
Patent Attorneys
By David B Fitzpatrick

Our Ref : 437985

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(54) Title
ADHESIVE POLYESTER FILM

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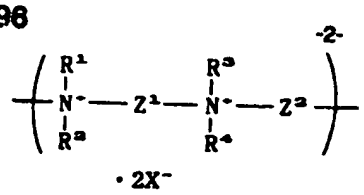
(57) Claim

1. An adhesive polyester film which comprises (A) an aromatic polyester film and (B) an adhesive coating film present on at least one side of the aromatic polyester film (A), the coating film being made from a composition comprising (a) a carboxylic acid group-containing acrylic copolymer and (b) at least one polycationic polymer selected from the group consisting of polymers having a plurality of ammonium cations in the main chain and polymers having a plurality of pyrrolidinium rings in the main chain.

5. The adhesive polyester film of claim 1, wherein the carboxylic acid group-containing acrylic copolymer (a) has polymerized units derived from at least one unsaturated carboxylic acid selected from the group consisting of acrylic acid, methacrylic acid, maleic acid and fumaric acid.

7. The adhesive polyester film of claim 1, wherein the polymer having a plurality of ammonium cations in the main chain is a polycationic polymer having a recurring unit represented by the following formula (1):

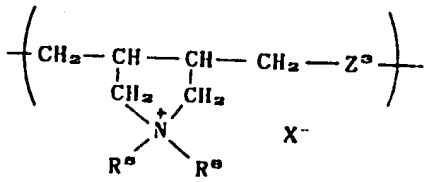
.../2



.....(1)

wherein R^1, R^2, R^3 and R^4 are the same or different and selected from the group consisting of an alkyl group, cycloalkyl group, aryl group, aralkyl group and these groups partially substituted with a hetero atom, Z^1 and Z^2 are the same or different and selected from the group consisting of an alkylene group, cycloalkylene group, arylene group, aralkylene group and these groups partially substituted with a hetero atom, and X^- is a one-equivalent anion.

8. The adhesive polyester film of claim 1, wherein the polymer having a plurality of pyrrolidinium rings in the main chain is a polycationic polymer having a recurring unit represented by the following formula (2):



.....(2)

wherein R^5 and R^6 are the same or different and selected from the group consisting of a hydrogen atom, alkyl group, cycloalkyl group, aryl group, aralkyl group and these groups partially substituted with a hetero atom, Z^3 is a single bond or a $-SO_2-$ group, X^- is a one-equivalent anion, and both R^5 and R^6 cannot be a hydrogen atom.

10. A polyester film having an information function wherein an adhesive coating film is present on one side of the aromatic polyester film (A) of the adhesive polyester film of claim 1 and at least one of a magnetic recording layer and a printing ink layer is present on at least part of the surface of the adhesive coating film.

AUSTRALIA

Patents Act

COMPLETE SPECIFICATION
(ORIGINAL)

Class Int. Class

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Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority

Related Art:

Name of Applicant:

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Invention Title:

ADHESIVE POLYESTER FILM

Our Ref : 437985
POF Code: 128319/96613

The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

ADHESIVE POLYESTER FILM

Detailed Description of the Invention

This invention relates to an adhesive polyester film. More specifically, it relates to a polyester film which is excellent in both adhesive and antistatic properties.

Aromatic polyester films, particularly aromatic polyester films containing a white pigment such as titanium oxide, are used in a wide variety of fields such as magnetic cards, printing materials and the like. However, they have problems common to plastic films, such as easy occurrence of static electricity and various troubles in film production and processing steps and at the time of use of their products and poor adhesion to magnetic coatings and printing ink.

Particularly, a thick white polyester film which is used in magnetic cards such as telephone cards and prepaid cards has defects in its production and processing steps, antistatic properties as a final product and adhesion strength to UV ink and magnetic coatings, and hence, application of a primer to the polyester film has been proposed.

Heretofore, for improving the antistatic and adhesive properties of an aromatic polyester film, there has been available a method for forming a primer layer of a synthetic resin containing an antistatic agent on the surface of a film. In this case, an anionic or cationic compound is used as an antistatic agent, but it has been difficult for the compound to meet requirements for both adhesive and antistatic properties, particularly antistatic properties at a low humidity.

Generally speaking, a cationic compound such as a quaternary ammonium salt is excellent in antistatic properties at a low humidity but poor in thermal stability. Therefore, in an in-line coating method in which a cationic compound is applied to an unoriented or monoaxially oriented polyester film as a coating liquid and the film is oriented and heat treated, a cationic

compound loses its performance in most cases. It has been disclosed in the following patent publications that a polycationic polymer exhibits excellent antistatic properties even in the above in-line coating method.

JP-A-1-146931 (the term "JP-A" as used herein means an "unexamined published Japanese patent application") discloses a method for producing an antistatic polyester film which comprises the steps of applying a coating liquid containing a polymer having a pyrrolidinium ring in the main chain to at least one side of a polyester film and orienting the film.

JP-A-2-73833 discloses the production of an antistatic polyester film by applying a polymer having an ionized nitrogen element in the main chain to a polyester film and orienting the film.

JP-A-3-255139 discloses an antistatic laminated film prepared by forming a coating layer containing a polymer having an ionized nitrogen element in the main chain and a binder polymer on a film and orienting the film.

JP-A-4-288217 discloses an antistatic laminated film containing at least one polymer selected from the group consisting of a polymer having an ionized nitrogen element in the main chain, polyester, polyacrylate, polyurethane and a chlorine-containing polymer, a particle having an average particle diameter of 10 μm or less, and a melamine- or epoxy-based crosslinking agent.

However, since a deposit is generally produced when a cationic compound and an anionic compound are mixed together in an aqueous solvent, it has been difficult to obtain an antistatic composition comprising both a cationic compound and an anionic compound.

It is therefore an object of the invention to provide an adhesive polyester film having a novel adhesive coating film.

It is another object of the invention to provide an adhesive polyester film which is excellent both in adhesive and antistatic properties.

It is a further object of the invention to provide an adhesive polyester film having an adhesive coating film formed thereon containing both a cationic compound and an anionic compound.

It is still another object of the invention to provide an adhesive polyester film having an adhesive coating film formed thereon which can be easily formed from a coating liquid having excellent stability though it contains both a cationic compound and an anionic compound.

It is still another object of the invention to provide a polyester film having an information function which has a magnetic recording layer and/or a printing ink layer formed on an adhesive coating film.

Other objects and advantages of the invention will become apparent from the following description.

According to the present invention, firstly, the above objects and advantages of the invention can be attained by an adhesive polyester film which comprises (A) an aromatic polyester film and (B) an adhesive coating film present on at least one side of the aromatic polyester film (A), which is formed from a composition comprising (a) a carboxylic acid group-containing acrylic copolymer and (b) at least one polycationic polymer selected from the group consisting of polymers having a plurality of ammonium cations in the main chain and polymers having a plurality of pyrrolidinium rings in the main chain.

In the present invention, as the aromatic polyester, a linear saturated polyester which is synthesized from an aromatic dibasic acid or an ester forming derivative thereof and diol or an ester forming derivative thereof is preferred. Specific examples of the polyester include polyethylene terephthalate, polyethylene isophthalate, polybutyrene terephthalate, poly(1,4-cyclohexylenedimethylene terephthalate), polyethylene-2,6-naphthalene dicarboxylate and the like. The aromatic polyester of the present invention can be a copolymer of these polyesters or a blend between one of the polyesters

and a small amount of another resin. Among these, polyethylene terephthalate and polyethylene-2,6-naphthalene dicarboxylate are particularly preferred.

In the present invention, the aromatic polyester preferably contain a white pigment. Illustrative examples of the white pigment include titanium oxide and barium sulfate. They may be used alone or in combination. The white pigment is preferably contained in an amount of 5 to 20 % by weight of the aromatic polyester. In addition, the aromatic polyester may contain an inorganic filler such as silicon oxide, aluminum oxide, magnesium oxide, calcium carbonate, kaolin, talc or the like, an organic filler made of a resin, such as crosslinked polystyrene resin, crosslinked acrylic resin, urea, melamine resin, crosslinked silicone resin or the like, other resin such as polyethylene, polypropylene, ethylene-propylene copolymer and olefinic ionomer or the like, an antioxidant, an ultraviolet light absorber, a fluorescent brightener, and the like as required.

The aromatic polyester film (A) in the present invention preferably has a thickness of at least 20 μm, more preferably 50 to 500 μm, the most preferably 75 to 300 μm. If the thickness is less than 20 μm, the film lacks nerve, and if the thickness is too thick, namely more than 500 μm, film production properties are liable to deteriorate.

Preferably, the aromatic polyester film (A) is biaxially oriented.

In the present invention, a primer layer (adhesive coating film (B)) present on at least one side of the aromatic polyester film (A) is formed from a composition comprising (a) a carboxylic acid group-containing acrylic copolymer and (b) at least one polymer selected from the group consisting of polycationic polymers having a plurality of ammonium cations in the main chain and polycationic polymers having a plurality of pyrrolidinium rings in the main chain.

The adhesive coating film may be present on one side or both sides of the aromatic polyester film.

Preferably, the carboxylic acid group-containing acrylic copolymer (a) contains polymerized units derived from acrylic acid, methacrylic acid, maleic acid and fumaric acid as components for introducing a carboxylic acid group in the molecular side chain. These polymerized units may be used alone or in combination. Preferably, these polymerized units have free carboxylic acid group. Part of the carboxylic acid group can be a salt such as ammonium salt.

Units derived from the above unsaturated carboxylic acid groups are preferably contained in the carboxylic acid group-containing acrylic copolymer (a) in an amount of 0.5 to 10 mol%, more preferably 1 to 7 mol% of the total of the polymerized units.

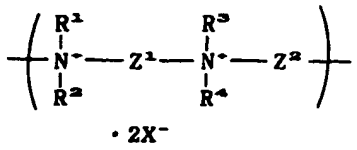
The carboxylic acid group-containing acrylic copolymer (a) in the present invention may comprise an unsaturated monomer having no carboxylic acid group, such as methyl acrylate, ethyl acrylate, butyl acrylate, 2-hydroxyethyl acrylate, methyl methacrylate, ethyl methacrylate, butyl methacrylate, 2-hydroxyethyl methacrylate, glycidyl methacrylate, acryl methacrylate, acrylamide, methacrylamide, N-methylol methacrylamide, N-methylol acrylamide, styrene, vinyl acetate, acrylonitrile, methacrylonitrile, vinyl chloride, vinylidene chloride and divinyl benzene, as other copolymerizable monomer, in addition to the above unsaturated carboxylic acids.

Further, as the carboxylic acid group-containing acrylic copolymer (a) in the present invention, a modified acrylic copolymer such as a block copolymer or a graft copolymer prepared by modifying a carboxylic acid group-containing acrylic copolymer with polyester, polyurethane, silicone resin, epoxy resin, phenol resin or the like may also be used.

The other component for forming the adhesive coating film in the present invention is a polycationic polymer.

The polycationic polymer is a polymer having a plurality of ammonium cations in the main chain or a polymer having a plurality of pyrrolidinium rings in the main chain.

The polymer having a plurality of ammonium cations in the main chain is preferably a polycationic polymer having a recurring unit represented by the following formula (1):



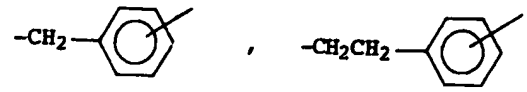
.....(1)

wherein R^1, R^2, R^3 and R^4 are the same or different and selected from the group consisting of an alkyl group, cycloalkyl group, aryl group, aralkyl group and these groups partially substituted with a hetero atom, Z^1 and Z^2 are the same or different and selected from the group consisting of an alkylene group, cycloalkylene group, arylene group, aralkylene group and these groups partially substituted with a hetero atom, and X^- is a one-equivalent anion.

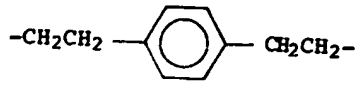
In the above formula (1), the aralkyl group may be of a straight chain or branched chain, and is preferably a low-alkyl group having 1 to 5 carbon atoms, such as methyl, ethyl, propyl or butyl. The cycloalkyl group is preferably a 5- or 6-membered cycloalkyl group such as cyclopentyl or cyclohexyl. Preferred examples of the aryl group include phenyl, tolyl, naphthyl and the like. Preferred examples of the aralkyl group include benzyl, phenethyl and the like. These groups partially substituted with a hetero atom, such as a haloalkyl group obtained by substituting the hydrogen atom of the alkyl group with a halogen atom, are also included.

The alkylene group represented by Z^1 and Z^2 is preferably a straight-chain alkylene group such as methylene, 1,2-ethylene, 1,3-trimethylene, 1,4-tetramethylene, α,ω-polymethylene and the like. Preferred examples of the cycloalkylene group include 1,2-cyclopentylene, 1,4-cyclohexylene and the like.

Illustrative examples of the arylene group include 1,3-phenylene, 1,4-phenylene and the like. The aralkylene group can be represented by the following formulas.



The group represented by

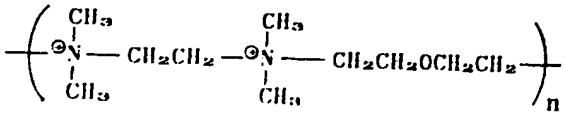


should be taken as an alkylene group.

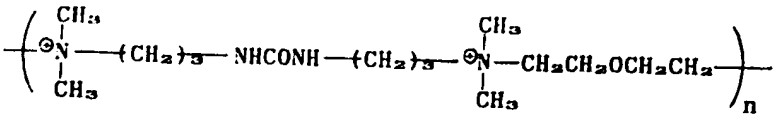
Illustrative examples of the groups partially substituted with a hetero atom include 2-hydroxy-1,3-trimethylene, $-CH_2CH_2OCH_2CH_2-$, $-(CH_2)_3-NHCONH-(CH_2)_3-$ and the like. These groups are equivalent to an alkylene group partially substituted with a hetero atom.

X^- is a one-equivalent anion with examples thereof including a halogen atom such as Cl^- or Br^-, $1/2 \cdot SO_4^{2-}$, $1/3 \cdot PO_4^{3-}$, $CH_3SO_4^-$, $C_2H_5SO_4^-$, $CH_3SO_3^-$, $C_2H_5SO_3^-$, $CH_3C_6H_4SO_3^-$, $C_nH_{2n+1}COO^-$ (n = 1 to 6) and the like.

Since illustrative examples of the compound represented by the above formula (1) are obvious from the above definitions, only some of them are given below.

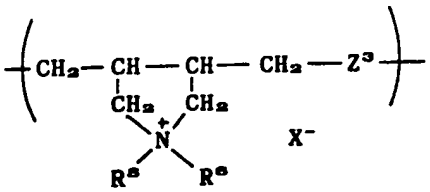


$\cdot 2Cl^-$



$\cdot 2Cl^-$

The polymer having a plurality of pyrrolidinium rings in the main chain is preferably a polycationic polymer having a recurring unit represented by the following formula (2):



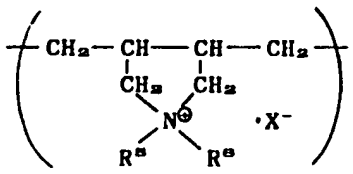
.....(2)

wherein R^5 and R^6 are the same or different and selected from the group consisting of a hydrogen atom, alkyl group, cycloalkyl group, aryl group, aralkyl group and these groups partially substituted with a hetero atom, Z^3 is a single bond or $-SO_2-$ group, X^- is a one-equivalent anion, and both R^5 and R^6 cannot be a hydrogen atom.

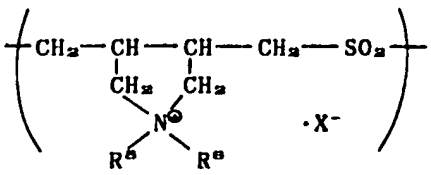
Illustrative examples of R^5, R^6 and X^- are obvious from the above examples given in the formula (1).

Z^3 is a single bond or $-SO_2-$ group.

Since the recurring unit represented by the above formula (2) is obvious from the above definition, only some examples of the compound are given below.

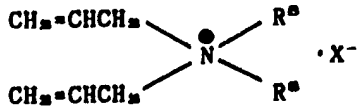


R^5, R^6 and X^- are defined the same as above.

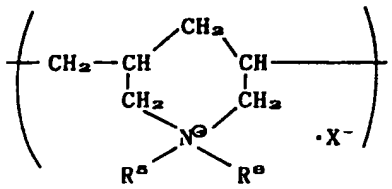


R^5, R^6 and X^- are defined the same as above.

The above compounds can be produced by radical polymerizing a monomer represented by the following formula:



wherein R^5, R^6 and X^- are defined the same as above, or by radical copolymerizing this monomer with sulfur dioxide. During the polymerization, a 6-membered recurring unit represented by the following formula is produced secondarily, in addition to the above pyrrolidinium ring.



wherein R^5, R^6 and X^- are defined the same as above.

The polycationic polymer having a plurality of pyrrolidinium rings in the main chain in the present invention can contain a recurring unit derived from other polymerizable unsaturated compound which can be polymerized with the above monomer, in addition to the recurring unit represented by the above formula (2). Preferably, the polycationic polymer contains the recurring unit represented by the above formula (2) in an amount of 20 to 100 mol% of the total of the recurring units.

In the adhesive coating film, the weight ratio of the carboxylic acid group-containing acrylic copolymer (a) to the polycationic polymer (b) is preferably in the range of 97:3 to 70:30, more preferably 95:5 to 70:30.

To form the adhesive coating film on at least one side of the aromatic polyester film (A), a method in which a coating film is formed on an unoriented aromatic polyester film which is then oriented or a method in which a coating film is formed on an oriented aromatic polyester film may be used.

The first method is carried out as follows.

A coating liquid made of an aqueous solution or an aqueous dispersion containing the carboxylic acid group-containing acrylic copolymer (a) and the polycationic polymer (b) is applied to an unoriented film prepared by

melting an aromatic polyester by heat and forming it into a film, a monoaxially oriented film prepared by orienting an unoriented film in a longitudinal or transverse direction, a film (biaxially oriented film before completion of orientation and crystallization by reorienting in a longitudinal or transverse direction in the final stage) prepared by orienting a film in both longitudinal and transverse directions at a low draw ratio, and the like, and these films are drawn to desired draw ratios. Known and desired coating techniques can be adopted. For example, roll coating, gravure coating, microgravure coating, reverse coating, roll brush coating, spray coating, air knife coating, impregnation, curtain coating and the like may be used alone or in combination. An aqueous coating may contain a slight amount of an organic solvent for the purpose of improving the stability or applicability of the coating.

The solid content of the coating in the present invention is typically 30 % or less by weight, preferably 20 % or less by weight.

The amount of coating is 0.5 to 50 g, preferably 5 or 30 g, per m^2 of a running film. The thickness of the final dried coating film needs to be 0.01 to 1 μm, preferably 0.02 to 0.6 μm. If the thickens is less than 0.01 μm, sufficient antistatic properties cannot be obtained and if the thickness is more than 1 μm, lubricity deteriorates unfavorably.

The coating may be mixed with additives such as a ultraviolet light absorber, pigment, antifoamer, applicability improving agent, organic filler, inorganic filler, lubricant, anti-blocking agent, melamine-, urea-, guanamine-, epoxy-, aziridine-, or block isocyanate-based crosslinking agent and coupling agent within limits not prejudicial to the object of the present invention.

When a coating is applied to a film oriented as desired, for example, a film subjected to final biaxial orientation, a coating (organic solvent coating) using an organic solvent can also be used. Illustrative examples

of the organic solvent include methyl ethyl ketone, acetone, ethyl acetate, tetrahydrofuran, dioxane, cyclohexanone, n-hexane, toluene, xylene, N-methyl pyrrolidone, methanol, ethanol, n-propanol, isopropanol and the like. They may be used alone or in combination.

Among the above methods, the method in which coating and then orientation are performed is preferred.

Only one side or both sides of a film can be coated according to the application purpose of the film. After coating, the film is dried and preferably further oriented to obtain a uniform coating film.

The adhesive polyester film of the present invention has at least one of a magnetic recording layer and a printing ink layer formed on the adhesive coating film.

Therefore, according to the present invention, there are provided (1) a polyester film having an information function, in which an adhesive coating film is present on one side of an aromatic polyester film (A) and at least one of a magnetic recording layer and a printing ink layer is present on at least part of the surface of the adhesive coating film, (2) a polyester film having an information function, in which an adhesive coating film is present on both sides of an aromatic polyester film (A) and at least one of a magnetic recording layer and a printing ink layer is present on at least part of the surface of one of the adhesive coating films, and (3) a polyester film having an information function, in which an adhesive coating film is present on both sides of an aromatic polyester film (A), a magnetic recording layer is mainly present on one of the adhesive coating films, and a printing ink layer is mainly present on the other adhesive coating film.

The magnetic recording layer is not particularly limited. Typical examples of the magnetic recording layer are given below. That is, they are mixtures of magnetic powders such as γ-Fe_2O_3, CrO_2, Co-γ-Fe_2O_3, Fe_3O_4, $BaO \cdot 6Fe_2O_3$ and other metal magnetic powders, binders made of vinyl resins such as polyvinyl acetate, polyvinylidene chloride and PVC, acrylic resins, rubber-based resins such as

acrylonitrile/butadiene copolymer, cellulose such as nitrocellulose, epoxy resins, phenolic resins and polyurethane resins, and a dispersant, lubricant, stabilizer, antistatic agent such as carbon black, plasticizer and the like which are added as required.

The printing ink layer is not particularly limited as well. Conventionally known ultraviolet light cured printing ink, electron beam cured ink, thermal recording ink and the like may be used.

The present invention is further illustrated with reference to the following examples. The properties of each example were obtained in accordance with the following methods.

1. stability of coating

A coating having a solid content of 10 % by weight is prepared, and a 30 ml portion of the coating is put into a 30 ml glass test tube and left to stand at room temperature for 24 hours. Agglomerates formed at the bottom of the test tube are visually judged. Agglomerates without change in properties are taken as O and deposited or gel agglomerates as x.

2. adhesive force of magnetic coating

The following evaluation coating is applied to a sample film by a Meyer bar in such a manner that the thickness of its coating film after drying becomes about 4 μm, and dried at 100°C for 3 minutes. Thereafter, the coating film is aged at 60°C for 24 hours and then a 12.7-mm wide 15 cm-long piece of Scotch Tape No.600 (manufactured by 3M) is adhered to the sample film while preventing entry of air bubbles. A manual load roll in accordance with JIS C2701 (1975) is rolled over the tape to firmly adhere it to the sample film and then a piece as wide as the tape is cut out from the sample film. Strength is measured when the tape is stripped at 180°.

[evaluation coating]

... the adhesive coating film.

25 parts by weight of an urethane resin (Nipporan 2304 manufactured by Nippon Polyurethane), 50 parts by weight of a vinyl chloride-vinyl acetate resin (Eslec A manufactured by Sekisui Chemical), 1 part by weight of a dispersant (Resion P manufactured by Riken Vitamin) and 500 parts by weight of a magnetic material (CTX-860 manufactured by Toda Chemical) in terms of solid content are dissolved in a solvent mixture of methyl ethyl ketone, toluene and cyclohexanone to prepare a 40 % solution and dispersed with a sand grinder for 2 hours. Thereafter, 25 parts by weight of a crosslinking agent (Colonate L) is added to the solution and stirred well to obtain a magnetic coating.

3. adhesive force of UV ink

Ultraviolet light cured printing ink (Flash Dry FD Calton P Magenta □ manufactured by Toyo Ink) is printed on a sample film by an RI tester (manufactured by Akari Seisakusho) and cured with an UV curing apparatus with a moderate-pressure mercury lamp (80 W/cm, single lamp, manufactured by Nippon Battery) to form a 4 μm-thick UV ink layer. A 15 cm-long piece of scotch tape (18 mm wide, Cellotape manufactured by Nichiban) is adhered to this UV ink layer and rolled with a 2 kg manual load roll to give a certain load. While the film is fixed, the scotch tape is stripped at 90° from one end thereof to evaluate its adhesive force. Adhesive force is judged according to the following five criteria.

5: The ink layer is not stripped at all.
4: Less than 3 % of the ink layer is stripped.
3: 3 to 10 % of the ink layer is stripped.
2: 10 to 30 % of the ink layer is stripped.
1: More than 30 % of the ink layer is stripped.

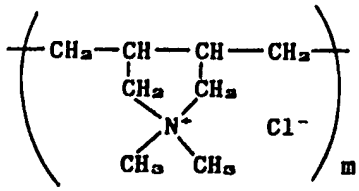
4. antistatic properties

Antistatic properties are evaluated by measuring the surface resistivity (Ω/□) of a sample film 1 minute after application voltage of 500 V at a measurement temperature

of 23°C, humidities of 65 % and 45 %, using a resistivity measurement instrument manufactured by Takeda Riken. The surface resistivity is preferably 1 x 10^{11} Ω/□or less.

Example 1

A composition consisting of 90 % by weight of a polyester (intrinsic viscosity: 0.63) comprising a terephthalic acid component and an ethylene glycol component and 10 % by weight of titanium oxide was molten and extruded on a rotary cooling drum maintained at 20°C to prepare an unoriented film. The unoriented film was then drawn to 3.6 times in the direction of a mechanical axis, and 10 g/m^2 (wet) of a primer coating comprising (1) 70 % by weight of an aqueous dispersion containing a 10 % solid content of an acryl polymer (number average molecular weight: 331,000) produced from methyl methacrylate, acrylic acid, 2-hydroxyethyl methacrylate and N-methylol acrylamide, (2) 20 % by weight of an aqueous solution (concentration: 10 % by weight) of a polycationic polymer (number average molecular weight: 29,000) having a plurality of pyrrolidinium rings in the main chain of the following structure as an antistatic agent, and (3) 10 % by weight of an aqueous solution of polyoxyethylene nonylphenylether (concentration of 10 % by weight) as a surfactant was applied to both sides of the film by lick roller coating. Subsequently, the film was drawn to 3.9 times in a transverse direction to obtain a 188 μm thick biaxially oriented polymer coated film.



The adhesive properties of the magnetic coating on the treated surface (primer layer surface) of this film, the adhesive force and antistatic properties of the UV ink

and the stability of the coating used are shown in Table 1.

Example 2

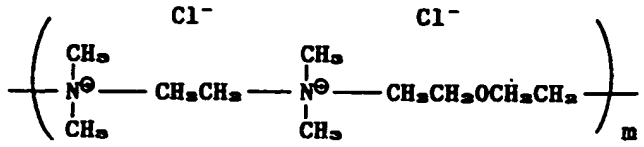
A biaxially oriented primer coated polyester film was obtained by applying 10 g/m^2 (wet) of a primer coating having the same composition as that of Example 1 except that the acryl polymer used in Example 1 was changed to an acryl polymer (number average molecular weight: 230,000) produced from methyl methacrylate, acrylonitrile, methacrylic acid and N-methylol methacrylamide.

The adhesive properties of the magnetic coating on the treated surface of this film, the adhesive force and antistatic properties of the UV ink and the stability of the coating used are shown in Table 1.

Example 3

A composition consisting of 90 % by weight of a polyester (intrinsic viscosity: 0.62) comprising a terephthalic acid component and an ethylene glycol component and 10 % by weight of titanium oxide was molten and extruded on a rotary cooling drum maintained at 20°C to prepare an unoriented film. The unoriented film was then drawn to 3.6 times in the direction of a mechanical axis, and 10 g/m^2 (wet) of a primer coating comprising (1) 70 % by weight of an aqueous dispersion containing a 10 % solid content of an acryl polymer (number average molecular weight: 321,000) produced from methyl methacrylate, acrylic acid, 2-hydroxyethyl methacrylate and N-methylol acrylamide, (2) 20 % by weight of an aqueous solution (concentration: 10 % by weight) of a polycationic polymer (number average molecular weight: 6,000) having a plurality of quarternized amino cation groups in the main chain of the following structure as an antistatic agent, and (3) 10 % by weight of an aqueous solution of polyoxyethylene nonylphenylether (concentration of 10 % by weight) as a surfactant was applied to both sides of the film by lick roller coating. Subsequently, the film was drawn to 3.9 times in a

transverse direction to obtain a 188 μm thick biaxially oriented polymer coated film.



The adhesive properties of the magnetic coating on the treated surface (primer layer surface) of this film, the adhesive force and antistatic properties of the UV ink and the stability of the coating used are shown in Table 1.

Example 4

A biaxially oriented primer coated polyester film was obtained by applying 10 g/m^2 (wet) of a primer coating having the same composition as that of Example 3 except that the acryl polymer used in Example 3 was changed to an acryl polymer (number average molecular weight: 229,000) produced from methyl methacrylate, acrylonitrile, methacrylic acid and N-methylol methacrylamide.

The adhesive properties of the magnetic coating on the treated surface of this film, the adhesive force and antistatic properties of the UV ink and the stability of the coating used are shown in Table 1.

Comparative Example 1

A biaxially oriented primer coated polyester film was obtained by applying 10 g/m^2 (wet) of a primer coating having the same composition as that of Example 1 except that the acryl polymer used in Example 1 was changed to an acryl polymer (number average molecular weight: 253,000) produced from methyl methacrylate, ethyl acrylate and N-methylol acrylamide.

The adhesive properties of the magnetic coating on the treated surface of this film, the adhesive force and antistatic properties of the UV ink and the stability of the coating used are shown in Table 1.

Comparative Example 2

A primer coating having exactly the same composition as that of Example 1 except that the acryl polymer used in Example 1 was changed to an acryl polymer (number average molecular weight: 252,000) prepared from methyl methacrylate, ethyl acrylate and sodium methacrylsulfonate was prepared. However, it was difficult to apply the primer coating to the film because of its poor stability. The stability of the coating is shown in Table 1.

Comparative Example 3

A primer coating having exactly the same composition as that of Example 1 except that the acryl polymer used in Example 1 was changed to a copolyester (Tg = 17°C) having an intrinsic viscosity of 0.59 and produced from terephthalic acid, isophthalic acid, 5-sodium sulfoisophthalic acid and diethylene glycol was prepared. However, it was difficult to apply the primer coating to the film because of its poor stability. The stability of the coating is shown in Table 1.

Comparative Example 4

A biaxially oriented primer coated polyester film was obtained by applying 10 g/m^2 (wet) of a primer coating having exactly the same composition as that of Example 1 except that the antistatic agent used in Example 1 was changed to sodium dodecylsufonate to both sides of the film.

The adhesive properties of the magnetic coating on the treated surface of this film, the adhesive force and antistatic properties of the UV ink and the stability of the coating used are shown in Table 1.

Comparative Example 5

A biaxially oriented primer coated polyester film was obtained by applying 10 g/m^2 (wet) of a primer coating having exactly the same composition as that of Example 1 except that the antistatic agent used in Example 1 was changed to a copolymer produced from methyl methacrylate, ethyl acrylate, 2-hydroxyethyl methacrylate and dimethylaminoethyl methacrylate to both sides of the film.

The adhesive properties of the magnetic coating on the treated surface of this film, the adhesive force and antistatic properties of the UV ink and the stability of the coating used are shown in Table 1.

Comparative Example 6

The adhesive properties of the magnetic coating on the surface of a biaxially oriented polyester film obtained without primer coating in Example 1 and the adhesive force and antistatic properties of the UV ink are shown in Table 1.

Table 1

	stability of coating	adhesive force of magnetic coating (g/ 1/2")	adhesive force of UV ink	surface resistivity (Ω/□)	
				23° C,65%RH	23° C,45%RH
Example 1	○	45	5	5×10^9	7×10^{10}
Example 2	○	47	5	7×10^9	6×10^{10}
Example 3	○	44	5	4×10^9	6×10^{10}
Example 4	○	46	5	6×10^9	5×10^{10}
Co. Ex. 1	○	31	3	9×10^9	6×10^{10}
Co. Ex. 2	X	-	-	-	-
Co. Ex. 3	X	-	-	-	-
Co. Ex. 4	○	16	2	9×10^{10}	8×10^{12}
Co. Ex. 5	○	46	4	$> 10^{15}$	$> 10^{15}$
Co. Ex. 6	-	9	1	$> 10^{15}$	$> 10^{15}$

The adhesive polyester film of the present invention is excellent in adhesive force and antistatic properties compared with the prior art and very useful as a printing material and a material for use in magnetic cards and magnetic disks.

The claims defining the invention are as follows:

1. An adhesive polyester film which comprises (A) an aromatic polyester film and (B) an adhesive coating film present on at least one side of the aromatic polyester film (A), the coating film being made from a composition comprising (a) a carboxylic acid group-containing acrylic copolymer and (b) at least one polycationic polymer selected from the group consisting of polymers having a plurality of ammonium cations in the main chain and polymers having a plurality of pyrrolidinium rings in the main chain.

2. The adhesive polyester film of claim 1, wherein the aromatic polyester film (A) contains a white pigment.

3. The adhesive polyester film of claim 1, wherein the aromatic polyester film (A) has a thickness of at least 20 μm.

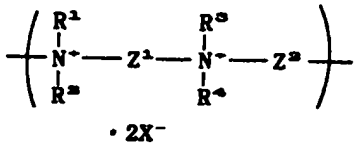
4. The adhesive polyester film of claim 1, wherein the adhesive coating film (B) is present on both sides of the aromatic polyester film (A).

5. The adhesive polyester film of claim 1, wherein the carboxylic acid group-containing acrylic copolymer (a) has polymerized units derived from at least one unsaturated carboxylic acid selected from the group consisting of acrylic acid, methacrylic acid, maleic acid and fumaric acid.

6. The adhesive polyester film of claim 1, wherein the carboxylic acid group-containing acrylic copolymer (a) contains polymerized units derived from an unsaturated carboxylic acid in an amount of 0.5 to 10 mol% based on the total of polymerized units.

7. The adhesive polyester film of claim 1, wherein the polymer having a plurality of ammonium cations in the main

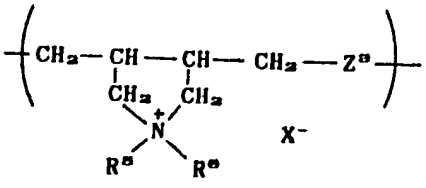
chain is a polycationic polymer having a recurring unit represented by the following formula (1):



.....(1)

wherein R^1, R^2, R^3 and R^4 are the same or different and selected from the group consisting of an alkyl group, cycloalkyl group, aryl group, aralkyl group and these groups partially substituted with a hetero atom, Z^1 and Z^2 are the same or different and selected from the group consisting of an alkylene group, cycloalkylene group, arylene group, aralkylene group and these groups partially substituted with a hetero atom, and X^- is a one-equivalent anion.

8. The adhesive polyester film of claim 1, wherein the polymer having a plurality of pyrrolidinium rings in the main chain is a polycationic polymer having a recurring unit represented by the following formula (2):



.....(2)

wherein R^5 and R^6 are the same or different and selected from the group consisting of a hydrogen atom, alkyl group, cycloalkyl group, aryl group, aralkyl group and these groups partially substituted with a hetero atom, Z^3 is a single bond or a $-SO_2-$ group, X^- is a one-equivalent anion, and both R^5 and R^6 cannot be a hydrogen atom.

9. The adhesive polyester film of claim 1, wherein the weight ratio of the carboxylic acid group-containing acrylic copolymer (a) to the polycationic polymer (b) is in the range of 97:3 to 70:30.

10. A polyester film having an information function wherein an adhesive coating film is present on one side of the aromatic polyester film (A) of the adhesive polyester film of claim 1 and at least one of a magnetic recording layer and a printing ink layer is present on at least part of the surface of the adhesive coating film.

11. A polyester film having an information function wherein an adhesive coating film is present on both sides of the aromatic polyester film (A) of the adhesive polyester film of claim 1 and at least one of a magnetic recording layer and a printing ink layer is present on at least part of the surface of either one of the adhesive coating films.

12. A polyester film having an information function wherein an adhesive coating film is present on both sides of the aromatic polyester film (A) of the adhesive polyester film of claim 1, a magnetic recording layer is mainly present on the surface of one of the adhesive coating films, and a printing ink layer is mainly present on the surface of the other adhesive coating film.

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